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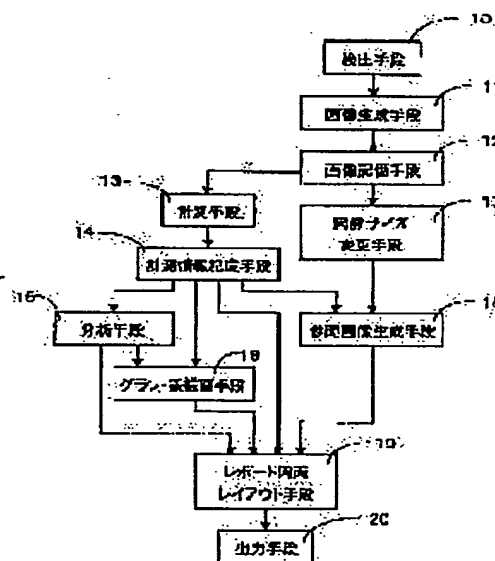
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(54) IMAGE DIAGNOSIS DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To simultaneously refer to diagnosis support information created based on a measured value and a caliper image when the measured value is provided, in an image diagnosis device.

SOLUTION: A measured image as a basis of diagnosis support information (measured value, analyzed result, graph) is changed in size by an image size changing means 17, a caliper mark is synthesized by a reference image creating means, and the reference image (a caliper image whose size is changed) is created. The reference image and the diagnosis support information are laid out onto a same screen by a report screen layout means 19 and are outputted by an output means 20. Thus, the diagnosis support information and the caliper image when the measured value is provided are simultaneously referred to on the same screen. Organically linked inspection information can be recognized at a glance to improve quality of the inspection result. In the case of a medical apparatus, load on a patient can be reduced due to shortage of an inspection time.



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CLAIMS

[Claim(s)]

[Claim 1] An image storage means to memorize a condition image to be examined, and a measurement means to perform measurement of said condition image, A measurement information storage means to memorize the measurement information about the contents of measurement and the measurement result by said measurement means, An image size-change means to change the size of said condition image, and a reference image generation means to pile up the caliper mark obtained from said measurement information storage means on the condition image changed in size, and to generate a reference image, Image diagnostic equipment characterized by providing a report screen layout means to arrange the diagnostic support information acquired from said measurement information storage means, and said reference image on the same screen, and to generate a report screen, and the output means which carries out the display output of said report screen.

[Claim 2] Image diagnostic equipment according to claim 1 characterized by having an external image input means to input a condition image to be examined from the outside, and to store in said image storage means.

[Claim 3] Image diagnostic equipment according to claim 1 characterized by having the external image and a measurement information input means to input from the outside the condition image with which the measurement information about the contents of measurement and a measurement result is recorded by attaching, to store said condition image in said image storage means, and to store said measurement information in said measurement information storage means.

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[Claim 1] An image storage means to memorize a condition image to be examined, and a measurement means to perform measurement of said condition image, A measurement information storage means to memorize the measurement information about the contents of measurement and the measurement result by said measurement means, An image size-change means to change the size of said condition image, and a reference image generation means to pile up the caliper mark obtained from said measurement information storage means on the condition image changed in size, and to generate a reference image, Image diagnostic equipment characterized by providing a report screen layout means to arrange the diagnostic support information acquired from said measurement information storage means, and said reference image on the same screen, and to generate a report screen, and the output means which carries out the display output of said report screen.

[Claim 2] Image diagnostic equipment according to claim 1 characterized by having an external image input means to input a condition image to be examined from the outside, and to store in said image storage means.

[Claim 3] Image diagnostic equipment according to claim 1 characterized by having the external image and a measurement information input means to input from the outside the condition image with which the measurement information about the contents of measurement and a measurement result is recorded by attaching, to store said condition image in said image storage means, and to store said measurement information in said measurement information storage means.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the image diagnostic equipment which offers an analysis result as a result of measuring a status information image to be examined especially as a report about image diagnostic equipment.

[0002]

[Description of the Prior Art] Image diagnostic equipment is equipment with which status information to be examined is acquired, the status information is imaged using sensors, such as a CCD camera, an ultrasonic sensor, and an X-ray sensor, and a tester is provided. A tester performs inspection and a diagnosis based on the image. As such image diagnostic equipment, an ultrasonic flow detector, a medical ultrasound equipment, CT and MRI, an endoscope, a microscope, X-ray inspection equipment, etc. are known well. Generally, the function which measures the die length, area, lightness, etc. of the part of arbitration on the displayed image is mounted in such image diagnostic equipment.

[0003] As a measurement value obtained by the measurement function, the measurement value directly obtained by measurement, such as die length, area, and lightness, is mentioned in the first place. The volume, the rate of flow, a pressure, the number of pregnancy weeks, etc. make a parameter one or more values acquired by measurement, and there is [second] a measurement value obtained by performing data processing and transform processing. The both are included when only calling it a "measurement value" on these specifications.

[0004] Hereafter, an ultrasonic diagnostic equipment is made into an example and the approach of the distance measurement in image diagnostic equipment is explained. First, a tester contacts an ultrasonic probe to a patient and acquires a patient's ultrasonic image (usually cross-section image). This image is automatically memorized by image storage memory with directions of a tester. Next, a tester chooses the image it is judged that is most suitable for measurement with reference to the image in image storage memory. A tester starts a measurement function to the image. Then, the cursor called "caliper cursor" is displayed on a screen. The thing showing the screen at this time is drawing 7 (a), and the caliper cursor 41 is displayed on the ultrasonic image 42.

[0005] A tester moves to the starting point of distance measurement of this caliper cursor 41, and does the depression of the decision key. The starting point of the measurement to an ultrasonic diagnostic equipment is memorized by this, and the "fixed caliper cursor" which shows the starting point is displayed.

[0006] Then, a tester moves the caliper cursor 41 to the terminal point of distance measurement. Under the present circumstances, the auxiliary line of measurement is displayed between the fixed caliper cursor which shows the starting point, and the caliper cursor 41. It is drawing 7 (b) which showed the condition of the screen at this time, and on the ultrasonic image 42, the measurement auxiliary line 43 is displayed and the fixed caliper cursor 44 is displayed at the starting point of measurement. The image with which a "caliper mark", and a call and the caliper mark 45 pile up, and are displayed in accordance with this measurement auxiliary line 43, the caliper cursor 41, and the fixed caliper cursor 44 is called a

"caliper image" (this vocabulary is used below). In addition, in trace measurement, since distance measurement is taken for the example here, the caliper mark 45 is a straight line, but the caliper mark of a free form curve is displayed, and when performing area measurement by ellipse approximation, the caliper mark of an ellipse is displayed.

[0007] After it, a tester does the depression of the decision key, in order to decide a terminal point. While the terminal point of the measurement to an ultrasonic diagnostic equipment is memorized by this, distance is computed as a measurement value by it and it is displayed on a screen. It is drawing 7 (c) which showed the condition of the screen at this time, and the measurement result 46 is outputted on the screen.

[0008] At the end, if required, a measurement person can also direct the measurement item which substitutes the measurement value. For example, the distance measurement result like the point can be registered into an ultrasonic diagnostic equipment as a measurement value of embryonic BPD (overall diameter of an embryonic head).

[0009] As mentioned above, although the measurement procedure was explained about the ultrasonic diagnostic equipment, measurement is performed by the same procedure also in other image diagnostic equipment. The description of the measurement in image diagnostic equipment is that selection of the image for measurement, selection of measurement locations, such as the starting point and a terminal point, etc. are performed by decision of a tester.

[0010] In addition, various information which shows the contents of measurement, such as a location on the screen of not only a measurement value but the time to which measurement was carried out, a measurement item, and a measurement part, is acquired from said measurement function. Suppose that these are generically called "measurement information" on these specifications.

[0011] A tester is provided with these measurement values as a numerical form as they are, and also they are changed into the form which a tester tends to judge, for example, a graph, and a table, or add the analysis information over a measurement value, and a tester may be provided with them. Thus, generally the function to offer the information which supports inspection and a diagnosis of a tester is called "reporting facilities", and the screen displayed by reporting facilities is called "report screen."

[0012] What kind of thing is displayed on the format of a report screen, i.e., a report screen, changes with the subjects of examination and the inspection fields of image diagnostic equipment, and it changes also with manufacturers of equipment. For reference, an ultrasonic diagnostic equipment is taken for an example and an example of a report screen is explained.

[0013] The example of the 1st report screen shown in drawing 8 tends to judge whether the measurement value is settled in the range of a normal value about one thru/or two or more measurement values. The measurement item 51, a measurement value 52, the range 53 of a value where it is considered that each measurement value is normal, and the judgment result 54 with a normal measurement value are displayed on the screen. In drawing 8, measurement is performed about 3 measurement items, and it turns out that all were normal values.

[0014] The example of the 2nd report screen shown in drawing 9 offers the information on normal and the abnormalities of the measurement value in the 1st example using a graph. The graph 58 of the measurement item 55, a measurement value 56, 57 pregnancy weeks that add transform processing to the measurement value, and are obtained, and the number of pregnancy weeks of those is displayed on the screen. If the horizontal thick wire which shows the vertical line 59 of a graph 58 and the normal range 60 of a measurement value crosses, the value is normal, and in this example, it can judge with AxT being outlying observation. Like this example, a certain measurement value may once be changed into another measurement value, and a report screen which performs a normal-values judging to that value may be mounted.

[0015] The example of the 3rd report screen shown in drawing 10 presumes embryonic weight from one or two or more measurement values, and describes it on the graph called a "growth curve." Three measurement values, BPD, floor line, and AxT, 61, the child weight 62 (EFBW) presumed from the measurement value, 63 pregnancy weeks which were inputted by the tester, and a growth curve 64 are displayed on a screen, and the round head 65 which shows this child weight is written in growth curve

top 64. This growth curve serves as upper limits of normal 68, the average 67, and the normal-values minimum 66 from the top. Since the round head 65 which shows child weight is between upper limits of normal 68 and the normal-values minimum 66, it can be presumed that a measurement value is normal.

[0016] The example of the 4th report screen shown in drawing 11 reads the weight of the embryonic past memorized by external storage etc., and describes it on a growth curve serially. The past 3 times of the child weights 69 and a growth curve 70 are displayed on the screen. The round head 71 corresponding to each child weight is written in the growth curve 70. In this growth curve, since a round head 71 is between upper limits of normal 74 and the normal-values minimum 72 altogether, it turns out that the embryo is continuing growth normally.

[0017] By using the above report screens, a tester can draw a more exact diagnosis to a subject of examination.

[0018] However, the measurement result obtained by image diagnostic equipment is much influenced by discretion of a tester as explained in the approach of the measurement in image diagnostic equipment. For example, in the CRL (slant range which connects tip of embryonic head and hip) measurement in an ultrasonic diagnostic equipment, which point it considers that which point is the tip of the embryonic head, and considers is the tip of an embryonic hip may change with testers, and, naturally a measurement value is also influenced by it. Image diagnostic equipment will accept the value as a measurement value of CRL, and will perform subsequent processing, even if it measures the die length of other parts using the function which measures CRL, when extreme.

[0019] Furthermore, a measurement value is influenced as boil whether the image set up as a candidate for measurement is that it is the image or the image which is not good which caught the condition to be examined good.

[0020] He can understand that the information which part of the image what kind of image was set up as a candidate for measurement, and was measured how by the above thing in acquiring the value when the value measured by image diagnostic equipment is used and the information which, so to speak, shows the "history" of a measurement value are indivisible.

[0021] If the report screen is also constituted at all using the information acquired from a measurement value, it is necessary to get to know the history of a measurement value. Therefore, since the most effective means is referring to the caliper image at the time of obtaining a measurement value, a tester has to call a report screen and a caliper image by turns, and has to refer to them in many cases.

[0022] For this reason, the method of applying the technique (JP,9-330374,A, JP,10-97582,A, etc.) of the medical information systems program of managing a measurement value, a report screen, and the caliper image at the time of measurement as a set has usually been used. If this specifies a measurement value and a key stroke is performed, equipment will call a caliper screen at the time of measurement, and will change and display a screen.

[0023] Moreover, when a measurement item and a measurement procedure can register as a series of sequences beforehand, there is also a proposal of decreasing a tester's number of actuation, by carrying out sequential starting of the caliper screen at the time of a report screen or measurement, and going (JP,9-251364,A).

[0024]

[Problem(s) to be Solved by the Invention] However, in the image diagnostic equipment of these former, the caliper image and report at the time of measurement are displayed on still another screen, and were not able to be referred to to coincidence. When referring to the report screen, and it was going to get to know whether it was obtained as a result of the analysis information and the measurement value on the report screen having set up what kind of image for measurement, and having measured which part of the image how, the screen had to be changed by the complicated key stroke, or the caliper image at the time of measurement had to be called out of storage.

[0025] Although a report is frequently created using the measurement value obtained from two or more images, the burden of the tester at the time of referring to a caliper image especially in such cases at the time of measurement becomes very large. A tester has to perform a key stroke and has to change a screen one after another.

[0026] The conventional technique which surely was introduced previously, i.e., the method of managing the caliper image and report screen at the time of measurement as one set, and the approach of starting a screen automatically one by one and going were released from the complicatedness of informational management of a tester. However, also in these approaches, it was hard to say that not necessarily sufficient improvement of the actuation for referring to each screen still existing, and a caliper image being unable to refer to it to coincidence at the time of the report information which should be combined organically essentially, and measurement etc. is achieved, and there was lack still more in the field of improvement in a patient throughput.

[0027] This invention aims at offering the image diagnostic equipment which can refer to that it is simultaneous and easily the caliper image used when acquiring various information required for a diagnosis, and the information of those in a report screen, in order to solve the above problem.

[0028]

[Means for Solving the Problem] An image storage means to memorize a condition image to be examined for image diagnostic equipment in this invention in order to solve the above-mentioned technical problem, The measurement means which measures a condition image, and a measurement information storage means to memorize the measurement information about the contents of measurement and the measurement result by the measurement means, An image size-change means to change the size of a condition image, and a reference image generation means to pile up the caliper mark obtained from a measurement information storage means on the condition image changed in size, and to generate a reference image, It considered as the configuration possessing a report screen layout means to arrange the diagnostic support information and the reference image which are obtained from a measurement information storage means on the same screen, and to generate a report screen, and the output means which carries out the display output of the report screen.

[0029] Thus, by having constituted, the caliper image at the time of the measurement changed in size into suitable magnitude can be displayed as a reference image on a report screen, and the caliper image used when acquiring various information required for a diagnosis and the information of those can be referred to that it is simultaneous and easily in a report screen.

[0030] Moreover, an external image input means to have inputted a condition image to be examined from the outside, and to store in an image storage means was established. Thus, by having constituted, it can measure about the condition of the past to be examined, and a report can be created.

[0031] Moreover, the external image and a measurement information input means to have inputted from the outside the condition image with which the measurement information about the contents of measurement and a measurement result is recorded by attaching, to have stored a condition image in an image storage means, and to store measurement information in a measurement information storage means were established. Thus, by having constituted, the measurement information on the past to be examined can be displayed on a report.

[0032]

[Embodiment of the Invention] An image storage means by which invention of this invention according to claim 1 memorizes a condition image to be examined, The measurement means which measures said condition image, and a measurement information storage means to memorize the measurement information about the contents of measurement and the measurement result by said measurement means, An image size-change means to change the size of said condition image, and a reference image generation means to pile up the caliper mark obtained from said measurement information storage means on the condition image changed in size, and to generate a reference image, A report screen layout means to arrange the diagnostic support information acquired from said measurement information storage means, and said reference image on the same screen, and to generate a report screen, It is the image diagnostic equipment possessing the output means which carries out the display output of said report screen, and has an operation of displaying diagnostic support information on the same screen as a reference image as a report.

[0033] In image diagnostic equipment according to claim 1, invention of this invention according to claim 2 is equipped with an external image input means to input a condition image to be examined from

the outside, and to store in said image storage means, inputs and measures a condition image from the exterior, and has an operation of displaying diagnostic support information on the same screen as a reference image as a report.

[0034] Invention of this invention according to claim 3 is set to image diagnostic equipment according to claim 1. The condition image with which the measurement information about the contents of measurement and a measurement result is recorded by attaching is inputted from the outside. It has the external image and a measurement information input means to store said condition image in said image storage means, and to store said measurement information in said measurement information storage means, a condition image with measurement information is inputted, and it has an operation of displaying diagnostic support information on the same screen as a reference image as a report.

[0035] Hereafter, the gestalt of operation of this invention is explained to a detail, referring to drawing 1 - drawing 6 .

[0036] (The gestalt [1st / the] of operation) It is the image diagnostic equipment which displays the report screen which has arranged the diagnostic support-information group which the gestalt of operation of the 1st of this invention measures a condition image to be examined, and memorizes the measurement information about the contents of measurement, and a measurement result, and it changes a condition image into suitable size, piles up a caliper mark, uses it as a reference image, and is obtained from measurement information on the same screen as a reference image.

[0037] Drawing 1 is drawing showing the configuration of the 1st of the image diagnostic equipment of the gestalt of operation of this invention. In drawing 1 , the detection means 10 is a means to acquire status information to be examined, and is realized by sensors, such as a supersonic sensor, a magnetic sensor, and a CCD component. Sensors should just select a suitable thing by the subject of examination, the contents of inspection, and the condition detection principle. The image generation means 11 is a means to generate the image for one frame used for a diagnosis based on the signal acquired by the sensor 10. The image storage means 12 is a storage means by which the image generated by the image generation means 11 can be chosen as arbitration, and can be memorized two or more sheets, and is realized by this contractor with the storage currently called "SHINEMEMORI" and a "frame memory."

[0038] The measurement means 13 is a means to have the function which measures the image memorized by the image storage means 12. The measurement information storage means 14 is a storage means to memorize measurement information, such as the information about the measurement performed by the measurement means 13, i.e., a measurement location, a measurement stage, a measurement item, and a measurement result. The analysis means 15 is a means to offer analysis information, such as the average of a measurement item, and a normal abnormality judging, based on measurement information, such as a measurement location memorized by the measurement information storage means 14, a measurement stage, a measurement item, and a measurement result.

[0039] A graph and the table drawing means 16 are means to draw a graph and a table based on the measurement information memorized by the measurement information storage means 14 and the analysis information offered from the date analysis means 15. The image size conversion means 17 is a means to perform zooming processing and clipping processing to the image of the arbitration memorized by the image storage means 12. The reference image generation means 18 is carrying out superposition composition of the caliper mark described using the information on the measurement location memorized by the measurement information storage means 14 or a measurement item, and the image which is generated by the image size conversion means 17 and which was changed in size, and is a means to generate a reference image.

[0040] The report screen layout means 19 is a means arrange one thru/or plurality for the measurement information memorized by the measurement information storage means 14, the analysis information offered from the analysis means 15, the graph and table which are offered from a graph and the table generation means 16, and the reference image offered from the reference image generation means 18 on one report screen. Although it is a means to provide a tester with the report screen arranged by the report screen layout means 19 and a display device is usually used, anything may be used for them as long as the output means 20 are output units, such as a printer, a video printer, a plotter, a film, and external

storage.

[0041] Actuation of the image diagnostic equipment of the gestalt of operation of the 1st of this invention constituted as mentioned above is explained. In image diagnostic equipment, the detection means 10 detects a condition to be examined first, and the image generation means 11 generates the image for one screen based on the information. This image is automatically memorized by the image storage means 12 with directions of a tester. Next, out of the image group stored into the image storage means 12, a tester chooses a desired image and measures to this using the measurement means 13.

Under the present circumstances, a series of measurement information, such as a measurement item, a measurement location, a measurement stage, and a measurement result, is memorized by the measurement information storage means 14.

[0042] As for a tester, only a required count repeats storage of an image, selection of the image for measurement, and implementation of measurement. If required measurement is completed, a tester directs creation of a report to diagnostic equipment. In response, diagnostic equipment changes in size the image which became a candidate for measurement using the image size-change means 17. From the measurement information storage means 14, the reference image generation means 18 acquires information, describes a caliper mark, carries out superposition composition of this at the image changed in size with the image size-change means 17, and generates a reference image. When there are two or more images used as the candidate for measurement, the image for measurement which carries out reference imaging is chosen with the priority decided beforehand or directions of a tester. When two or more indication of the reference image is given, this procedure is repeated and is performed.

[0043] On the other hand, the analysis means 15 acquires information, such as a measurement item, a measurement value, and a measurement stage, from a measurement information storage means, and generates the range regarded as a measurement value being normal, the average, other analysis information effective in a diagnosis, etc. with reference to the formula and table which were prepared for every measurement item. Using the analysis information generated by the analysis means 15, and the measurement information currently recorded on the measurement information storage means 14, the graph and the table drawing means 16 were decided beforehand, or describes the graph and table which a tester directs. Based on the diagnostic field and diagnostic contents of image diagnostic equipment, it should just determine of what kind of format a graph and a table are mounted.

[0044] The report screen layout means 19 bears the duty which arranges the above-mentioned measurement information, a reference image, an analysis result, and a graph and a table in the format which is easy to understand to a tester. What arranged three measurement values 33 used for drawing 2 as 1st example of arrangement presuming a growth curve 31, the child weight 34 displayed on the growth curve, and its child weight and the thing 32 which carried out reference imaging of the three caliper images at the time of obtaining the measurement value is shown. What arranged the measurement value 36 displayed on drawing 3 on the normal-values judging graph 35 and the graph and the thing 37 which carried out reference imaging of three in the measurement screen at the time of obtaining the measurement value as 2nd example of arrangement is shown.

[0045] In addition, in addition to this, it is also possible to arrange two or more graphs and tables, and this is not limited. Moreover, if even the display of the reference image which is the description of this invention is performed, it is not necessary to necessarily indicate all of measurement information, an analysis result, and a graph and a table. That is, an analysis result is not displayed but an example of arrangement like drawing 4 which displayed two things 40 which carried out reference imaging of the measurement relevant to two sheets and the graph of those for a graph 39 is also considered to be a measurement value 38.

[0046] By the above flow, the output means 20 outputs the report screen arranged by the report screen layout means to a tester.

[0047] Thus, it is displayed without a complicated key stroke at the time of measurement that a caliper screen and the report information which supports a diagnosis are checked at a glance, and is made. By displaying a reference image on the same screen, the measurement value currently displayed on the report screen and analysis information can recognize now easily whether it is what was obtained based

on what kind of measurement. In other words, the history of a measurement value or analysis information becomes clearly [in a report screen] and lucid. It makes it possible for this to contribute to the progression in quality of the diagnostic result which a tester gives greatly, and to perform a high quality diagnosis more for a short time.

[0048] as mentioned above, with the gestalt of operation of the 1st of this invention Measure a condition image to be examined for image diagnostic equipment, and the measurement information about the contents of measurement and a measurement result is memorized. Since changed the condition image into suitable size, the caliper mark was piled up, it considered as the reference image and it considered as the configuration which displays the report screen which has arranged the diagnostic support information group obtained from measurement information on the same screen as a reference image A tester cannot perform a complicated key stroke but ** can also check a caliper screen and the report information to which a diagnosis is supported at a glance at the time of measurement.

[0049] (Gestalt of the 2nd operation) The gestalt of operation of the 2nd of this invention is image diagnostic equipment which measures by inputting a condition image to be examined from the outside, changes a condition image in size, piles up a caliper mark, considers as a reference image, and displays measurement information and a reference image as a report screen on the same screen.

[0050] Drawing 5 is drawing showing the configuration of the 2nd of the image diagnostic equipment of the gestalt of operation of this invention. In addition to the configuration of image diagnostic equipment shown in drawing 1 , in the image diagnostic equipment shown in drawing 5 , it has an external image input means 21 to read an image from external storage or an external circuit.

[0051] Actuation of the image diagnostic equipment of the gestalt of operation of the 2nd of this invention constituted as mentioned above is explained. First, the external image input means 21 reads the image from the outside. As an image which serves as an input at this time, the case of the image memorized by external storage, such as a floppy disk and MO, the case of the picture signal inputted by BNC etc., etc. can be considered. The these-inputted image is changed into the format that the image storage means 12 is memorizable with the external image input means 21, and is automatically memorized by the image storage means 12 with directions of a tester.

[0052] The actuation after the phase where a next tester chooses a desired image and measures to this using the measurement means 13 out of the image group stored into the image storage means 12 is the same as that of the gestalt of the 1st operation.

[0053] Thus, it measures about the condition of the past to be examined, and a report is created. Moreover, it also becomes possible to create a report which compares the condition of the past to be examined with a current condition, and to display secular change to be examined on a report.

[0054] In addition, as for the image which the image generation means 11 generates with a procedure as shown in the gestalt of the 1st operation as an image group stored into the image storage means 12, and the image generated by the external image input means 21, it is desirable that it can be intermingled. Moreover, the detection means 10 and the image generation means 11 can be abolished, and it can also consider as the image diagnostic equipment of an image server format by specializing in an input from the outside.

[0055] as mentioned above, with the gestalt of operation of the 2nd of this invention Image diagnostic equipment is measured by inputting a condition image to be examined from the outside. Since it considered as the configuration which displays the reference image which changed the condition image into suitable size, and piled up and compounded the caliper mark, and measurement information as a report screen on the same screen It can measure about the condition image of the past to be examined, and the report which has arranged the condition image as a reference image can be created.

[0056] (Gestalt of the 3rd operation) The gestalt of operation of the 3rd of this invention is image diagnostic equipment which displays the condition image with which measurement was performed in the past, the reference image which inputted the measurement information accompanying the condition image from the outside, changed the condition image into suitable size, and piled up and compounded the caliper mark, and measurement information as a report screen on the same screen.

[0057] Drawing 6 is drawing showing the configuration of the 3rd of the image diagnostic equipment of

the gestalt of operation of this invention. In addition to the configuration of image diagnostic equipment shown in drawing 1, in the image diagnostic equipment shown in drawing 6, it has the external image and a measurement information input means 22 to read the image with which measurement information used for report creation time, such as a measurement stage, a measurement item, and a measurement result, attached from external storage or an external circuit.

[0058] Actuation of the image diagnostic equipment of the gestalt of operation of the 3rd of this invention constituted as mentioned above is explained. First, an external image and the measurement information input means 22 read the image with which measurement information attached from the exterior. Among these, the measurement information to which an image attaches to the image storage means 12 is memorized by the measurement information storage means 14, respectively. Then, a tester directs creation of a report to image diagnostic equipment, if, and it will measure further and all required measurement will be completed. Subsequent actuation is the same as that of the gestalt of the 1st operation.

[0059] Thus, the measurement information on the past to be examined is displayed on a report. It becomes possible for change of an embryonic growth curve and the magnitude of a neoplasm, change of the die length of a blemish, etc. to create the report which displays a measurement result on time series.

[0060] In addition, it is desirable to consider as the configuration which can use the measurement means 13 also with the image group which is inputted from an external image and the measurement information input means 22, and is stored into the image storage means 12. Moreover, the detection means 10 and the image generation means 11 can be abolished, and it can also consider as the image diagnostic equipment of an image server format by specializing in an input from the outside.

[0061] As mentioned above, since it considered as the configuration which displays the reference image on top of which the image with which measurement was performed in the past in image diagnostic equipment, and its measurement information were inputted into with the gestalt of operation of the 3rd of this invention, the image was changed in size into, and the caliper mark was laid, and measurement information as a report screen on the same screen, a reference image can arrange to the report which displays the measurement information on the past to be examined by time series.

[0062]

[Effect of the Invention] As mentioned above, an image storage means to memorize a condition image to be examined for image diagnostic equipment in this invention, The measurement means which measures a condition image, and a measurement information storage means to memorize the measurement information about the contents of measurement and the measurement result by the measurement means, An image size-change means to change the size of a condition image, and a reference image generation means to pile up the caliper mark obtained from a measurement information storage means on the condition image changed in size, and to generate a reference image, Since it considered as the configuration possessing a report screen layout means to arrange the diagnostic support information and the reference image which are obtained from a measurement information storage means on the same screen, and to generate a report screen, and the output means which carries out the display output of the report screen A reference image, measurement information, analysis information, a graph, and a table are concentrated and displayed on one report screen, much required inspection information can be recognized at a glance rather than the tester was organically connected on one screen, and the effectiveness that the quality of an inspection result improves is acquired. Furthermore, a tester is released from a complicated key stroke, a tester's burden can be made light because the need for a screen change decreases, and the effectiveness that compaction of inspection time amount and improvement in a patient throughput can be aimed at is acquired. When a subject of examination is human being (patient) like medical equipment, the effectiveness that the burden of the patient by compaction of inspection time amount is also mitigable is acquired.

[0063] Moreover, since an external image input means to have inputted a condition image to be examined from the outside, and to store in an image storage means was established, the condition image of the past to be examined is measured, and the effectiveness of becoming possible to create the port which displayed the condition image as a reference image is acquired.

[0064] Moreover, the condition image with which the measurement information about the contents of measurement and a measurement result is recorded by attaching is inputted from the outside. Since the external image and a measurement information input means to have stored a condition image in an image storage means, and to store measurement information in a measurement information storage means were established Also in the report which displays the measurement information on the past to be examined on a report, and displays serially change of an embryonic growth curve or the magnitude of a neoplasm, the die length of a blemish, etc., the effectiveness of becoming possible to arrange a reference image is acquired.

[Translation done.]

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TECHNICAL FIELD

[Field of the Invention] This invention relates to the image diagnostic equipment which offers an analysis result as a result of measuring a status information image to be examined especially as a report about image diagnostic equipment.

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PRIOR ART

[Description of the Prior Art] Image diagnostic equipment is equipment with which status information to be examined is acquired, the status information is imaged using sensors, such as a CCD camera, an ultrasonic sensor, and an X-ray sensor, and a tester is provided. A tester performs inspection and a diagnosis based on the image. As such image diagnostic equipment, an ultrasonic flow detector, a medical ultrasound equipment, CT and MRI, an endoscope, a microscope, X-ray inspection equipment, etc. are known well. Generally, the function which measures the die length, area, lightness, etc. of the part of arbitration on the displayed image is mounted in such image diagnostic equipment.

[0003] As a measurement value obtained by the measurement function, the measurement value directly obtained by measurement, such as die length, area, and lightness, is mentioned in the first place. The volume, the rate of flow, a pressure, the number of pregnancy weeks, etc. make a parameter one or more values acquired by measurement, and there is [second] a measurement value obtained by performing data processing and transform processing. The both are included when only calling it a "measurement value" on these specifications.

[0004] Hereafter, an ultrasonic diagnostic equipment is made into an example and the approach of the distance measurement in image diagnostic equipment is explained. First, a tester contacts an ultrasonic probe to a patient and acquires a patient's ultrasonic image (usually cross-section image). This image is automatically memorized by image storage memory with directions of a tester. Next, a tester chooses the image it is judged that is most suitable for measurement with reference to the image in image storage memory. A tester starts a measurement function to the image. Then, the cursor called "caliper cursor" is displayed on a screen. The thing showing the screen at this time is drawing 7 (a), and the caliper cursor 41 is displayed on the ultrasonic image 42.

[0005] A tester moves to the starting point of distance measurement of this caliper cursor 41, and does the depression of the decision key. The starting point of the measurement to an ultrasonic diagnostic equipment is memorized by this, and the "fixed caliper cursor" which shows the starting point is displayed.

[0006] Then, a tester moves the caliper cursor 41 to the terminal point of distance measurement. Under the present circumstances, the auxiliary line of measurement is displayed between the fixed caliper cursor which shows the starting point, and the caliper cursor 41. It is drawing 7 (b) which showed the condition of the screen at this time, and on the ultrasonic image 42, the measurement auxiliary line 43 is displayed and the fixed caliper cursor 44 is displayed at the starting point of measurement. The image with which a "caliper mark", and a call and the caliper mark 45 pile up, and are displayed in accordance with this measurement auxiliary line 43, the caliper cursor 41, and the fixed caliper cursor 44 is called a "caliper image" (this vocabulary is used below). In addition, in trace measurement, since distance measurement is taken for the example here, the caliper mark 45 is a straight line, but the caliper mark of a free form curve is displayed, and when performing area measurement by ellipse approximation, the caliper mark of an ellipse is displayed.

[0007] After it, a tester does the depression of the decision key, in order to decide a terminal point. While the terminal point of the measurement to an ultrasonic diagnostic equipment is memorized by

this, distance is computed as a measurement value by it and it is displayed on a screen. It is drawing 7 (c) which showed the condition of the screen at this time, and the measurement result 46 is outputted on the screen.

[0008] At the end, if required, a measurement person can also direct the measurement item which substitutes the measurement value. For example, the distance measurement result like the point can be registered into an ultrasonic diagnostic equipment as a measurement value of embryonic BPD (overall diameter of an embryonic head).

[0009] As mentioned above, although the measurement procedure was explained about the ultrasonic diagnostic equipment, measurement is performed by the same procedure also in other image diagnostic equipment. The description of the measurement in image diagnostic equipment is that selection of the image for measurement, selection of measurement locations, such as the starting point and a terminal point, etc. are performed by decision of a tester.

[0010] In addition, various information which shows the contents of measurement, such as a location on the screen of not only a measurement value but the time to which measurement was carried out, a measurement item, and a measurement part, is acquired from said measurement function. Suppose that these are generically called "measurement information" on these specifications.

[0011] A tester is provided with these measurement values as a numerical form as they are, and also they are changed into the form which a tester tends to judge, for example, a graph, and a table, or add the analysis information over a measurement value, and a tester may be provided with them. Thus, generally the function to offer the information which supports inspection and a diagnosis of a tester is called "reporting facilities", and the screen displayed by reporting facilities is called "report screen."

[0012] What kind of thing is displayed on the format of a report screen, i.e., a report screen, changes with the subjects of examination and the inspection fields of image diagnostic equipment, and it changes also with manufacturers of equipment. For reference, an ultrasonic diagnostic equipment is taken for an example and an example of a report screen is explained.

[0013] The example of the 1st report screen shown in drawing 8 tends to judge whether the measurement value is settled in the range of a normal value about one thru/or two or more measurement values. The measurement item 51, a measurement value 52, the range 53 of a value where it is considered that each measurement value is normal, and the judgment result 54 with a normal measurement value are displayed on the screen. In drawing 8, measurement is performed about 3 measurement items, and it turns out that all were normal values.

[0014] The example of the 2nd report screen shown in drawing 9 offers the information on normal and the abnormalities of the measurement value in the 1st example using a graph. The graph 58 of the measurement item 55, a measurement value 56, 57 pregnancy weeks that add transform processing to the measurement value, and are obtained, and the number of pregnancy weeks of those is displayed on the screen. If the horizontal thick wire which shows the vertical line 59 of a graph 58 and the normal range 60 of a measurement value crosses, the value is normal, and in this example, it can judge with AxT being outlying observation. Like this example, a certain measurement value may once be changed into another measurement value, and a report screen which performs a normal-values judging to that value may be mounted.

[0015] The example of the 3rd report screen shown in drawing 10 presumes embryonic weight from one or two or more measurement values, and describes it on the graph called a "growth curve." Three measurement values, BPD, floor line, and AxT, 61, the child weight 62 (EFBW) presumed from the measurement value, 63 pregnancy weeks which were inputted by the tester, and a growth curve 64 are displayed on a screen, and the round head 65 which shows this child weight is written in growth curve top 64. This growth curve serves as upper limits of normal 68, the average 67, and the normal-values minimum 66 from the top. Since the round head 65 which shows child weight is between upper limits of normal 68 and the normal-values minimum 66, it can be presumed that a measurement value is normal.

[0016] The example of the 4th report screen shown in drawing 11 reads the weight of the embryonic past memorized by external storage etc., and describes it on a growth curve serially. The past 3 times of the child weights 69 and a growth curve 70 are displayed on the screen. The round head 71

corresponding to each child weight is written in the growth curve 70. In this growth curve, since a round head 71 is between upper limits of normal 74 and the normal-values minimum 72 altogether, it turns out that the embryo is continuing growth normally.

[0017] By using the above report screens, a tester can draw a more exact diagnosis to a subject of examination.

[0018] However, the measurement result obtained by image diagnostic equipment is much influenced by discretion of a tester as explained in the approach of the measurement in image diagnostic equipment. For example, in the CRL (slant range which connects tip of embryonic head and hip) measurement in an ultrasonic diagnostic equipment, which point it considers that which point is the tip of the embryonic head, and considers is the tip of an embryonic hip may change with testers, and, naturally a measurement value is also influenced by it. Image diagnostic equipment will accept the value as a measurement value of CRL, and will perform subsequent processing, even if it measures the die length of other parts using the function which measures CRL, when extreme.

[0019] Furthermore, a measurement value is influenced as to whether the image set up as a candidate for measurement is that it is the image or the image which is not good which caught the condition to be examined good.

[0020] He can understand that the information which part of the image what kind of image was set up as a candidate for measurement, and was measured how by the above thing in acquiring the value when the value measured by image diagnostic equipment is used and the information which, so to speak, shows the "history" of a measurement value are indivisible.

[0021] If the report screen is also constituted at all using the information acquired from a measurement value, it is necessary to get to know the history of a measurement value. Therefore, since the most effective means is referring to the caliper image at the time of obtaining a measurement value, a tester has to call a report screen and a caliper image by turns, and has to refer to them in many cases.

[0022] For this reason, the method of applying the technique (JP,9-330374,A, JP,10-97582,A, etc.) of the medical information systems program of managing a measurement value, a report screen, and the caliper image at the time of measurement as a set has usually been used. If this specifies a measurement value and a key stroke is performed, equipment will call a caliper screen at the time of measurement, and will change and display a screen.

[0023] Moreover, when a measurement item and a measurement procedure can register as a series of sequences beforehand, there is also a proposal of decreasing a tester's number of actuation, by carrying out sequential starting of the caliper screen at the time of a report screen or measurement, and going (JP,9-251364,A).

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EFFECT OF THE INVENTION

[Effect of the Invention] As mentioned above, an image storage means to memorize a condition image to be examined for image diagnostic equipment in this invention, The measurement means which measures a condition image, and a measurement information storage means to memorize the measurement information about the contents of measurement and the measurement result by the measurement means, An image size-change means to change the size of a condition image, and a reference image generation means to pile up the caliper mark obtained from a measurement information storage means on the condition image changed in size, and to generate a reference image, Since it considered as the configuration possessing a report screen layout means to arrange the diagnostic support information and the reference image which are obtained from a measurement information storage means on the same screen, and to generate a report screen, and the output means which carries out the display output of the report screen A reference image, measurement information, analysis information, a graph, and a table are concentrated and displayed on one report screen, much required inspection information can be recognized at a glance rather than the tester was organically connected on one screen, and the effectiveness that the quality of an inspection result improves is acquired. Furthermore, a tester is released from a complicated key stroke, a tester's burden can be made light because the need for a screen change decreases, and the effectiveness that compaction of inspection time amount and improvement in a patient throughput can be aimed at is acquired. When a subject of examination is human being (patient) like medical equipment, the effectiveness that the burden of the patient by compaction of inspection time amount is also mitigable is acquired.

[0063] Moreover, since an external image input means to have inputted a condition image to be examined from the outside, and to store in an image storage means was established, the condition image of the past to be examined is measured, and the effectiveness of becoming possible to create the port which displayed the condition image as a reference image is acquired.

[0064] Moreover, the condition image with which the measurement information about the contents of measurement and a measurement result is recorded by attaching is inputted from the outside. Since the external image and a measurement information input means to have stored a condition image in an image storage means, and to store measurement information in a measurement information storage means were established Also in the report which displays the measurement information on the past to be examined on a report, and displays serially change of an embryonic growth curve or the magnitude of a neoplasm, the die length of a blemish, etc., the effectiveness of becoming possible to arrange a reference image is acquired.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, in the image diagnostic equipment of these former, the caliper image and report at the time of measurement are displayed on still another screen, and were not able to be referred to to coincidence. When referring to the report screen, and it was going to get to know whether it was obtained as a result of the analysis information and the measurement value on the report screen having set up what kind of image for measurement, and having measured which part of the image how, the screen had to be changed by the complicated key stroke, or the caliper image at the time of measurement had to be called out of storage.

[0025] Although a report is frequently created using the measurement value obtained from two or more images, the burden of the tester at the time of referring to a caliper image especially in such cases at the time of measurement becomes very large. A tester has to perform a key stroke and has to change a screen one after another.

[0026] The conventional technique which surely was introduced previously, i.e., the method of managing the caliper image and report screen at the time of measurement as one set, and the approach of starting a screen automatically one by one and going were released from the complicatedness of informational management of a tester. However, also in these approaches, it was hard to say that not necessarily sufficient improvement of the actuation for referring to each screen still existing, and a caliper image being unable to refer to it to coincidence at the time of the report information which should be combined organically essentially, and measurement etc. is achieved, and there was lack still more in the field of improvement in a patient throughput.

[0027] This invention aims at offering the image diagnostic equipment which can refer to that it is simultaneous and easily the caliper image used when acquiring various information required for a diagnosis, and the information of those in a report screen, in order to solve the above problem.

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MEANS

[Means for Solving the Problem] An image storage means to memorize a condition image to be examined for image diagnostic equipment in this invention in order to solve the above-mentioned technical problem, The measurement means which measures a condition image, and a measurement information storage means to memorize the measurement information about the contents of measurement and the measurement result by the measurement means, An image size-change means to change the size of a condition image, and a reference image generation means to pile up the caliper mark obtained from a measurement information storage means on the condition image changed in size, and to generate a reference image, It considered as the configuration possessing a report screen layout means to arrange the diagnostic support information and the reference image which are obtained from a measurement information storage means on the same screen, and to generate a report screen, and the output means which carries out the display output of the report screen.

[0029] Thus, by having constituted, the caliper image at the time of the measurement changed in size into suitable magnitude can be displayed as a reference image on a report screen, and the caliper image used when acquiring various information required for a diagnosis and the information of those can be referred to that it is simultaneous and easily in a report screen.

[0030] Moreover, an external image input means to have inputted a condition image to be examined from the outside, and to store in an image storage means was established. Thus, by having constituted, it can measure about the condition of the past to be examined, and a report can be created.

[0031] Moreover, the external image and a measurement information input means to have inputted from the outside the condition image with which the measurement information about the contents of measurement and a measurement result is recorded by attaching, to have stored a condition image in an image storage means, and to store measurement information in a measurement information storage means were established. Thus, by having constituted, the measurement information on the past to be examined can be displayed on a report.

[0032]

[Embodiment of the Invention] An image storage means by which invention of this invention according to claim 1 memorizes a condition image to be examined, The measurement means which measures said condition image, and a measurement information storage means to memorize the measurement information about the contents of measurement and the measurement result by said measurement means, An image size-change means to change the size of said condition image, and a reference image generation means to pile up the caliper mark obtained from said measurement information storage means on the condition image changed in size, and to generate a reference image, A report screen layout means to arrange the diagnostic support information acquired from said measurement information storage means, and said reference image on the same screen, and to generate a report screen, It is the image diagnostic equipment possessing the output means which carries out the display output of said report screen, and has an operation of displaying diagnostic support information on the same screen as a reference image as a report.

[0033] In image diagnostic equipment according to claim 1, invention of this invention according to

claim 2 is equipped with an external image input means to input a condition image to be examined from the outside, and to store in said image storage means, inputs and measures a condition image from the exterior, and has an operation of displaying diagnostic support information on the same screen as a reference image as a report.

[0034] Invention of this invention according to claim 3 is set to image diagnostic equipment according to claim 1. The condition image with which the measurement information about the contents of measurement and a measurement result is recorded by attaching is inputted from the outside. It has the external image and a measurement information input means to store said condition image in said image storage means, and to store said measurement information in said measurement information storage means, a condition image with measurement information is inputted, and it has an operation of displaying diagnostic support information on the same screen as a reference image as a report.

[0035] Hereafter, the gestalt of operation of this invention is explained to a detail, referring to drawing 1 - drawing 6 .

[0036] (The gestalt [1st / the] of operation) It is the image diagnostic equipment which displays the report screen which has arranged the diagnostic support-information group which the gestalt of operation of the 1st of this invention measures a condition image to be examined, and memorizes the measurement information about the contents of measurement, and a measurement result, and it changes a condition image into suitable size, piles up a caliper mark, uses it as a reference image, and is obtained from measurement information on the same screen as a reference image.

[0037] Drawing 1 is drawing showing the configuration of the 1st of the image diagnostic equipment of the gestalt of operation of this invention. In drawing 1 , the detection means 10 is a means to acquire status information to be examined, and is realized by sensors, such as a supersonic sensor, a magnetic sensor, and a CCD component. Sensors should just select a suitable thing by the subject of examination, the contents of inspection, and the condition detection principle. The image generation means 11 is a means to generate the image for one frame used for a diagnosis based on the signal acquired by the sensor 10. The image storage means 12 is a storage means by which the image generated by the image generation means 11 can be chosen as arbitration, and can be memorized two or more sheets, and is realized by this contractor with the storage currently called "SHINEMEMORI" and a "frame memory."

[0038] The measurement means 13 is a means to have the function which measures the image memorized by the image storage means 12. The measurement information storage means 14 is a storage means to memorize measurement information, such as the information about the measurement performed by the measurement means 13, i.e., a measurement location, a measurement stage, a measurement item, and a measurement result. The analysis means 15 is a means to offer analysis information, such as the average of a measurement item, and a normal abnormality judging, based on measurement information, such as a measurement location memorized by the measurement information storage means 14, a measurement stage, a measurement item, and a measurement result.

[0039] A graph and the table drawing means 16 are means to draw a graph and a table based on the measurement information memorized by the measurement information storage means 14 and the analysis information offered from the data analysis means 15. The image size conversion means 17 is a means to perform zooming processing and clipping processing to the image of the arbitration memorized by the image storage means 12. The reference image generation means 18 is carrying out superposition composition of the caliper mark described using the information on the measurement location memorized by the measurement information storage means 14 or a measurement item, and the image which is generated by the image size conversion means 17 and which was changed in size, and is a means to generate a reference image.

[0040] The report screen layout means 19 is a means arrange one thru/or plurality for the measurement information memorized by the measurement information storage means 14, the analysis information offered from the analysis means 15, the graph and table which are offered from a graph and the table generation means 16, and the reference image offered from the reference image generation means 18 on one report screen. Although it is a means to provide a tester with the report screen arranged by the report screen layout means 19 and a display device is usually used, anything may be used for them as long as

the output means 20 are output units, such as a printer, a video printer, a plotter, a film, and external storage.

[0041] Actuation of the image diagnostic equipment of the gestalt of operation of the 1st of this invention constituted as mentioned above is explained. In image diagnostic equipment, the detection means 10 detects a condition to be examined first, and the image generation means 11 generates the image for one screen based on the information. This image is automatically memorized by the image storage means 12 with directions of a tester. Next, out of the image group stored into the image storage means 12, a tester chooses a desired image and measures to this using the measurement means 13. Under the present circumstances, a series of measurement information, such as a measurement item, a measurement location, a measurement stage, and a measurement result, is memorized by the measurement information storage means 14.

[0042] As for a tester, only a required count repeats storage of an image, selection of the image for measurement, and implementation of measurement. If required measurement is completed, a tester directs creation of a report to diagnostic equipment. In response, diagnostic equipment changes in size the image which became a candidate for measurement using the image size-change means 17. From the measurement information storage means 14, the reference image generation means 18 acquires information, describes a caliper mark, carries out superposition composition of this at the image changed in size with the image size-change means 17, and generates a reference image. When there are two or more images used as the candidate for measurement, the image for measurement which carries out reference imaging is chosen with the priority decided beforehand or directions of a tester. When two or more indication of the reference image is given, this procedure is repeated and is performed.

[0043] On the other hand, the analysis means 15 acquires information, such as a measurement item, a measurement value, and a measurement stage, from a measurement information storage means, and generates the range regarded as a measurement value being normal, the average, other analysis information effective in a diagnosis, etc. with reference to the formula and table which were prepared for every measurement item. Using the analysis information generated by the analysis means 15, and the measurement information currently recorded on the measurement information storage means 14, the graph and the table drawing means 16 were decided beforehand, or describes the graph and table which a tester directs. Based on the diagnostic field and diagnostic contents of image diagnostic equipment, it should just determine of what kind of format a graph and a table are mounted.

[0044] The report screen layout means 19 bears the duty which arranges the above-mentioned measurement information, a reference image, an analysis result, and a graph and a table in the format which is easy to understand to a tester. What arranged three measurement values 33 used for drawing 2 as 1st example of arrangement presuming a growth curve 31, the child weight 34 displayed on the growth curve, and its child weight and the thing 32 which carried out reference imaging of the three caliper images at the time of obtaining the measurement value is shown. What arranged the measurement value 36 displayed on drawing 3 on the normal-values judging graph 35 and the graph and the thing 37 which carried out reference imaging of three in the measurement screen at the time of obtaining the measurement value as 2nd example of arrangement is shown.

[0045] In addition, in addition to this, it is also possible to arrange two or more graphs and tables, and this is not limited. Moreover, if even the display of the reference image which is the description of this invention is performed, it is not necessary to necessarily indicate all of measurement information, an analysis result, and a graph and a table. That is, an analysis result is not displayed but an example of arrangement like drawing 4 which displayed two things 40 which carried out reference imaging of the measurement relevant to two sheets and the graph of those for a graph 39 is also considered to be a measurement value 38.

[0046] By the above flow, the output means 20 outputs the report screen arranged by the report screen layout means to a tester.

[0047] Thus, it is displayed without a complicated key stroke at the time of measurement that a caliper screen and the report information which supports a diagnosis are checked at a glance, and is made. By displaying a reference image on the same screen, the measurement value currently displayed on the

report screen and analysis information can recognize now easily whether it is what was obtained based on what kind of measurement. In other words, the history of a measurement value or analysis information becomes clearly [in a report screen] and lucid. It makes it possible for this to contribute to the progression in quality of the diagnostic result which a tester gives greatly, and to perform a high quality diagnosis more for a short time.

[0048] as mentioned above, with the gestalt of operation of the 1st of this invention Measure a condition image to be examined for image diagnostic equipment, and the measurement information about the contents of measurement and a measurement result is memorized. Since changed the condition image into suitable size, the caliper mark was piled up, it considered as the reference image and it considered as the configuration which displays the report screen which has arranged the diagnostic support information group obtained from measurement information on the same screen as a reference image A tester cannot perform a complicated key stroke but ** can also check a caliper screen and the report information to which a diagnosis is supported at a glance at the time of measurement.

[0049] (Gestalt of the 2nd operation) The gestalt of operation of the 2nd of this invention is image diagnostic equipment which measures by inputting a condition image to be examined from the outside, changes a condition image in size, piles up a caliper mark, considers as a reference image, and displays measurement information and a reference image as a report screen on the same screen.

[0050] Drawing 5 is drawing showing the configuration of the 2nd of the image diagnostic equipment of the gestalt of operation of this invention. In addition to the configuration of image diagnostic equipment shown in drawing 1 , in the image diagnostic equipment shown in drawing 5 , it has an external image input means 21 to read an image from external storage or an external circuit.

[0051] Actuation of the image diagnostic equipment of the gestalt of operation of the 2nd of this invention constituted as mentioned above is explained. First, the external image input means 21 reads the image from the outside. As an image which serves as an input at this time, the case of the image memorized by external storage, such as a floppy disk and MO, the case of the picture signal inputted by BNC etc., etc. can be considered. The these-inputted image is changed into the format that the image storage means 12 is memorizable with the external image input means 21, and is automatically memorized by the image storage means 12 with directions of a tester.

[0052] The actuation after the phase where a next tester chooses a desired image and measures to this using the measurement means 13 out of the image group stored into the image storage means 12 is the same as that of the gestalt of the 1st operation.

[0053] Thus, it measures about the condition of the past to be examined, and a report is created. Moreover, it also becomes possible to create a report which compares the condition of the past to be examined with a current condition, and to display secular change to be examined on a report.

[0054] In addition, as for the image which the image generation means 11 generates with a procedure as shown in the gestalt of the 1st operation as an image group stored into the image storage means 12, and the image generated by the external image input means 21, it is desirable that it can be intermingled. Moreover, the detection means 10 and the image generation means 11 can be abolished, and it can also consider as the image diagnostic equipment of an image server format by specializing in an input from the outside.

[0055] as mentioned above, with the gestalt of operation of the 2nd of this invention Image diagnostic equipment is measured by inputting a condition image to be examined from the outside. Since it considered as the configuration which displays the reference image which changed the condition image into suitable size, and piled up and compounded the caliper mark; and measurement information as a report screen on the same screen It can measure about the condition image of the past to be examined, and the report which has arranged the condition image as a reference image can be created.

[0056] (Gestalt of the 3rd operation) The gestalt of operation of the 3rd of this invention is image diagnostic equipment which displays the condition image with which measurement was performed in the past, the reference image which inputted the measurement information accompanying the condition image from the outside, changed the condition image into suitable size, and piled up and compounded the caliper mark, and measurement information as a report screen on the same screen.

[0057] Drawing 6 is drawing showing the configuration of the 3rd of the image diagnostic equipment of the gestalt of operation of this invention. In addition to the configuration of image diagnostic equipment shown in drawing 1 , in the image diagnostic equipment shown in drawing 6 , it has the external image and a measurement information input means 22 to read the image with which measurement information used for report creation time, such as a measurement stage, a measurement item, and a measurement result, attached from external storage or an external circuit.

[0058] Actuation of the image diagnostic equipment of the gestalt of operation of the 3rd of this invention constituted as mentioned above is explained. First, an external image and the measurement information input means 22 read the image with which measurement information attached from the exterior. Among these, the measurement information to which an image attaches to the image storage means 12 is memorized by the measurement information storage means 14, respectively. Then, a tester directs creation of a report to image diagnostic equipment, if, and it will measure further and all required measurement will be completed. Subsequent actuation is the same as that of the gestalt of the 1st operation.

[0059] Thus, the measurement information on the past to be examined is displayed on a report. It becomes possible for change of an embryonic growth curve and the magnitude of a neoplasm, change of the die length of a blemish, etc. to create the report which displays a measurement result on time series.

[0060] In addition, it is desirable to consider as the configuration which can use the measurement means 13 also with the image group which is inputted from an external image and the measurement information input means 22, and is stored into the image storage means 12. Moreover, the detection means 10 and the image generation means 11 can be abolished, and it can also consider as the image diagnostic equipment of an image server format by specializing in an input from the outside.

[0061] As mentioned above, since it considered as the configuration which displays the reference image on top of which the image with which measurement was performed in the past in image diagnostic equipment, and its measurement information were inputted into with the gestalt of operation of the 3rd of this invention, the image was changed in size into, and the caliper mark was laid, and measurement information as a report screen on the same screen, a reference image can arrange to the report which displays the measurement information on the past to be examined by time series.

[Translation done.]

*** NOTICES ***

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- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.**** shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The block diagram showing the configuration of the image diagnostic equipment in the gestalt of operation of the 1st of this invention,

[Drawing 2] Drawing of the report screen which has arranged the reference screen of the image diagnostic equipment in the gestalt of operation of the 1st of this invention,

[Drawing 3] Drawing of the report screen which has arranged the reference screen of the image diagnostic equipment in the gestalt of operation of the 1st of this invention,

[Drawing 4] Drawing of the report screen which has arranged only the measurement value, graph, and reference screen of image diagnostic equipment in the gestalt of operation of the 1st of this invention,

[Drawing 5] The block diagram showing the configuration of the image diagnostic equipment in the gestalt of operation of the 2nd of this invention,

[Drawing 6] The block diagram showing the configuration of the image diagnostic equipment in the gestalt of operation of the 3rd of this invention,

[Drawing 7] Drawing of the example of a display of the caliper cursor in the conventional image diagnostic equipment,

[Drawing 8] Drawing of the report screen which made the table analysis information in the conventional image diagnostic equipment, and carried out a screen display,

[Drawing 9] Drawing of the report screen which made the graph analysis information in the conventional image diagnostic equipment, and carried out a screen display,

[Drawing 10] Drawing of the report screen which carried out a screen display of the value of a measurement value to the growth curve in the conventional image diagnostic equipment,

[Drawing 11] It is drawing of the report screen which carried out a screen display of the value of the growth curve in the conventional image diagnostic equipment, and a measurement value to time series.

[Description of Notations]

12 Image Storage Means

13 Measurement Means

14 Measurement Information Storage Means

15 Analysis Means

16 Graph and Table Drawing Means

17 Image Size-Change Means

18 Reference Image Generation Means

19 Report Screen Layout Means

20 Output Means

21 External Image Input Means

22 External Image and Measurement Information Input Means

31 39 Growth curve

32 37 Reference image group

33 Measurement Item and Measurement Value

34 Presumed Child Weight
35 Normal and Abnormality Judging Fig.
36, 38, 56, 61, 69 Measurement value
40 Reference Image
41 Caliper Cursor
42 Ultrasonic Image
43 Measurement Auxiliary Line
44 Fixed Caliper Cursor
45 Caliper Mark
46 Measurement Result
55 Measurement Item
57 63 The number of pregnancy weeks
58 Graph
59 Vertical Line
60 Normal Range
62 Child Weight
64 70 Growth curve
65 71 Point displaying [child weight]
66 72 Normal-values minimum
67 73 Average
68 74 Upper limits of normal

[Translation done.]

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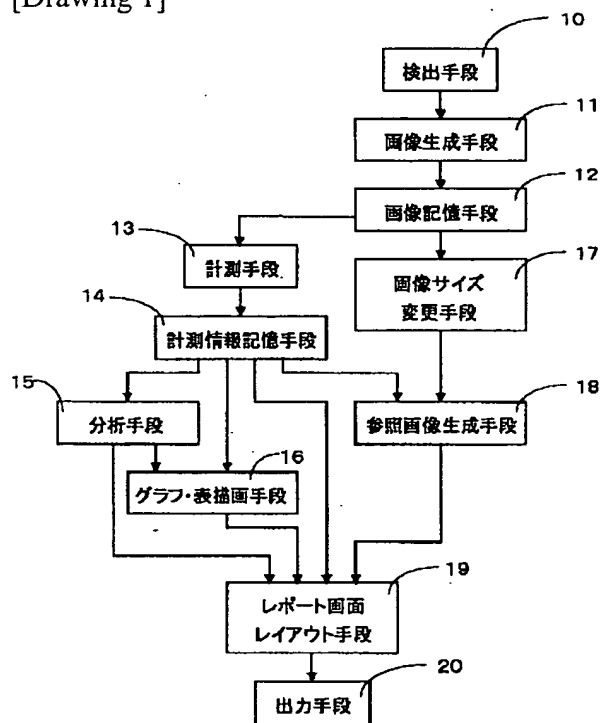
1. This document has been translated by computer. So the translation may not reflect the original precisely.

2. **** shows the word which can not be translated.

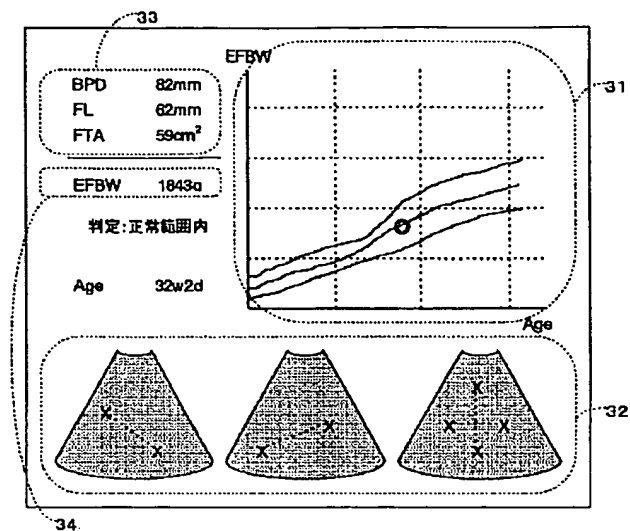
3. In the drawings, any words are not translated.

DRAWINGS

[Drawing 1]

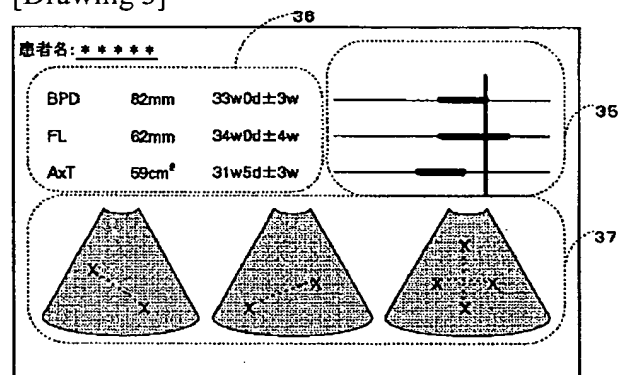


[Drawing 2]



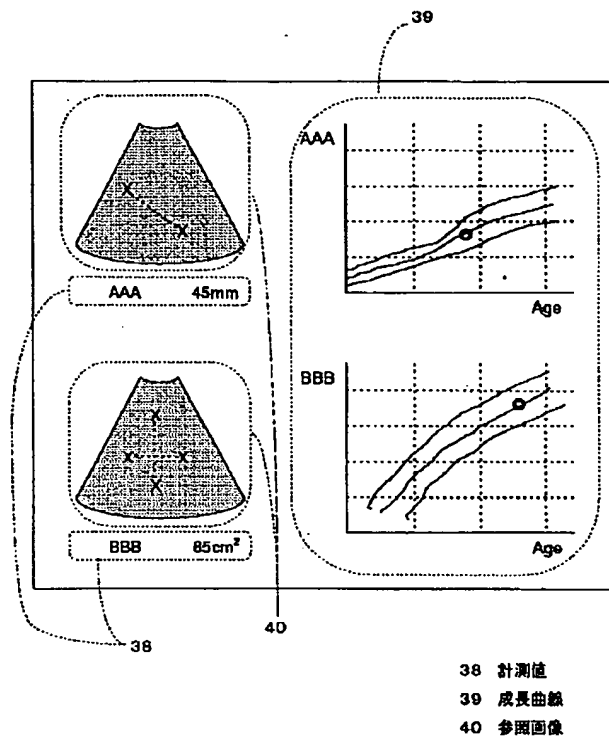
- 31 成長曲線
 32 参照画像群
 33 計測項目・計測値
 34 推定児体重

[Drawing 3]

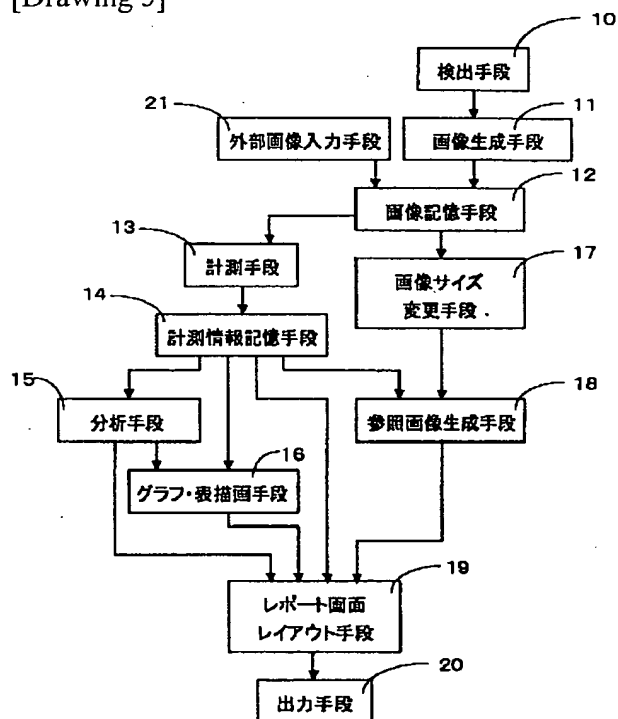


- 35 正常・異常判定図
 36 計測値
 37 参照画像群

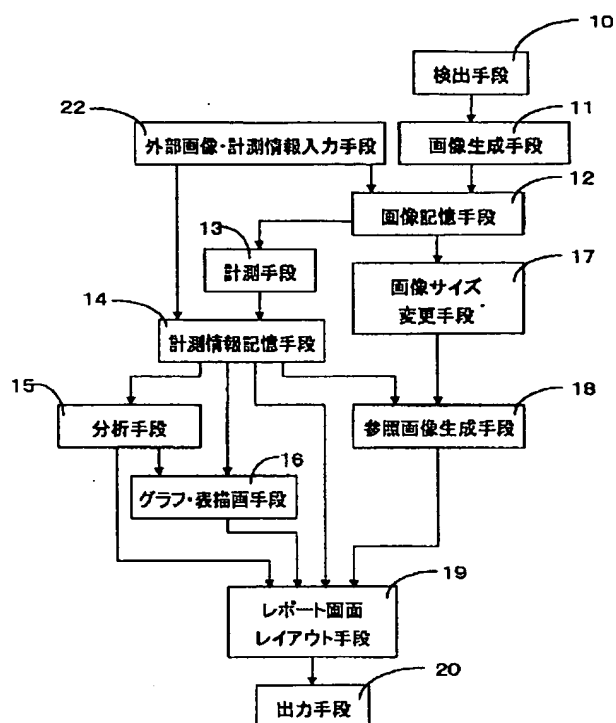
[Drawing 4]



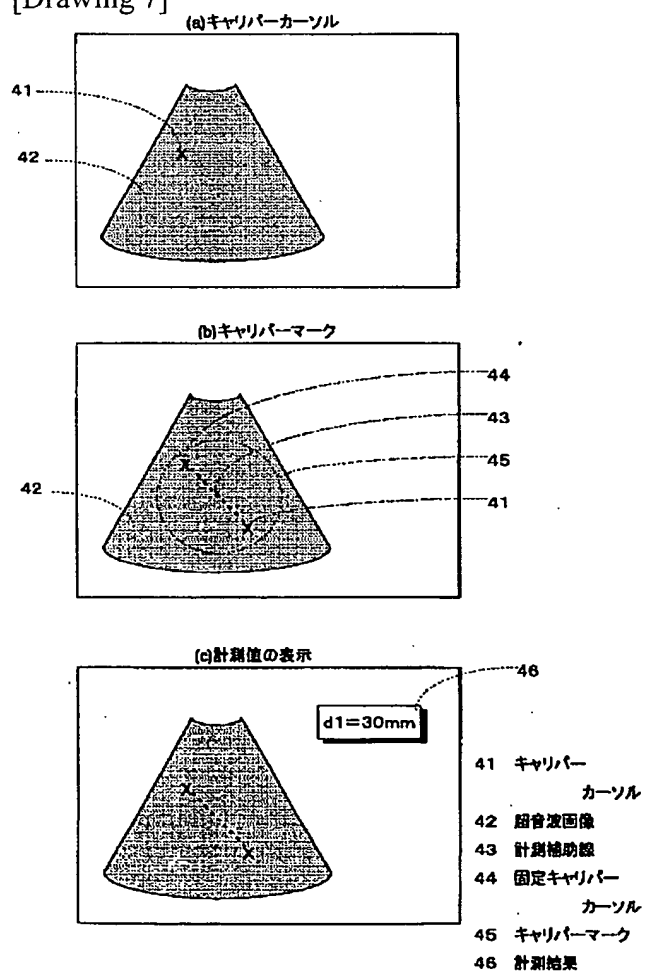
[Drawing 5]



[Drawing 6]



[Drawing 7]

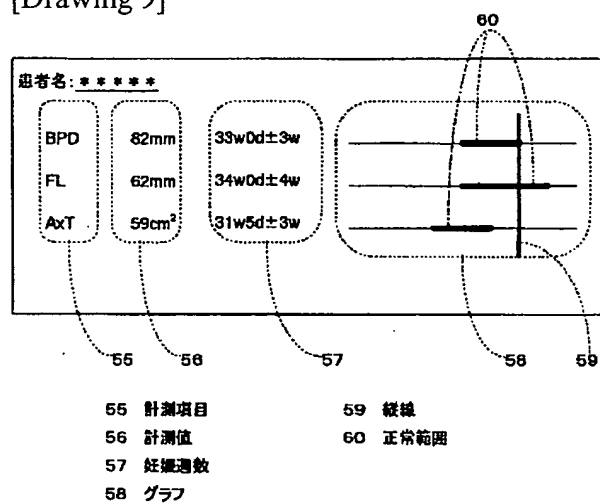


[Drawing 8]

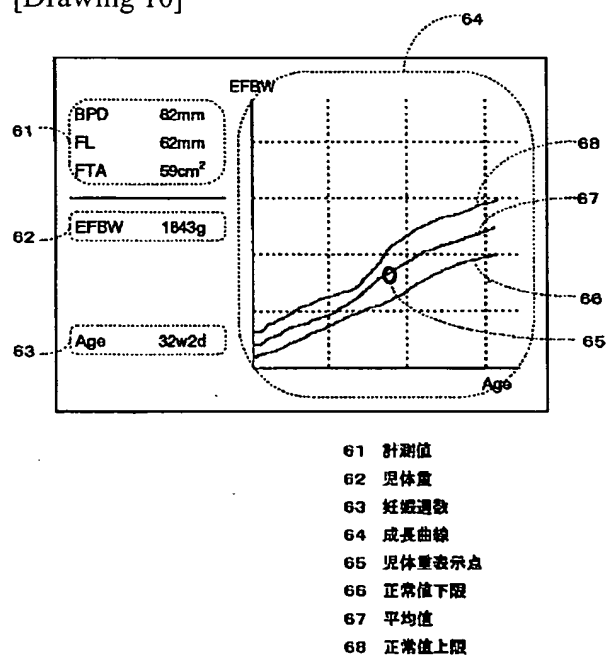
患者名: *****

計測項目	計測値	正常値	判定
AAA	---	---	---
BBB	---	---	---
CCC	85mm	80~90mm	正常
DDD	---	---	---
EEE	58mm	55~65mm	正常
FFF	---	---	---
GGG	44cm ²	40~45cm ²	正常

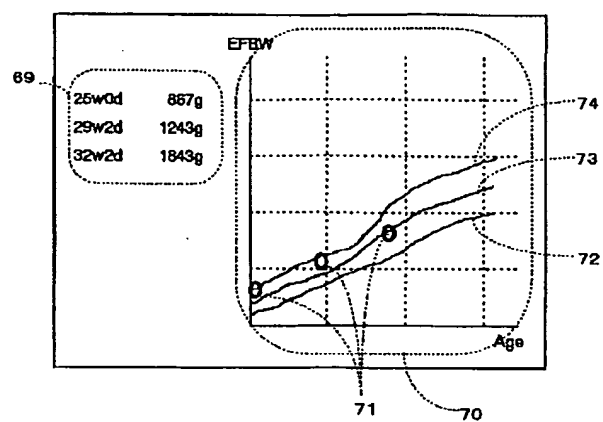
[Drawing 9]



[Drawing 10]



[Drawing 11]



- 69 計測値
70 成長曲線
71 児体重表示点
72 正常値下限
73 平均値
74 正常値上限

[Translation done.]